Volume II

Inspection of Emergency Management at the

Nevada Test Site

October 2002

Office of Independent Oversight and Performance Assurance
Office of the Secretary of Energy

INDEPENDENT OVERSIGHT INSPECTION OF EMERGENCY MANAGEMENT AT THE NEVADA TEST SITE

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Acronyms

BN	Bechtel Nevada
CAT	Consequence Assessment Team
CEMP	Consolidated Emergency Management Plan
DAF	Device Assembly Facility
DOE	U.S. Department of Energy
DTRA	Defense Threat Reduction Agency
EAL	Emergency Action Level
EMC	Emergency Management Center
EMHA	Emergency Management Hazards Assessment
EMHS	Emergency Management Hazards Survey
EMOT	Emergency Management Operations Team
EOC	Emergency Operations Center
EPZ	Emergency Planning Zone
ERAP	Emergency Readiness Assurance Plan
ERO	Emergency Response Organization
ERPG	Emergency Response Planning Guideline
ES&H	Environment, Safety, and Health
FY	Fiscal Year
HSC	Hazardous Material Spill Center
IC	Incident Commander
JIC	Joint Information Center
LANL	Los Alamos National Laboratory
LED	Local Emergency Director
LLNL	Lawrence Livermore National Laboratory
NTS	Nevada Test Site
NNSA	National Nuclear Security Administration
NV	Nevada Operations Office
OA	Office of Independent Oversight and Performance Assurance
OPA	Office of Public Affairs
PAC	Protective Action Criteria
TEEL	Temporary Emergency Exposure Limit

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INDEPENDENT OVERSIGHT INSPECTION OF EMERGENCY MANAGEMENT AT THE NEVADA TEST SITE

VOLUME II

1.0 INTRODUCTION

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA) conducted an inspection of environment, safety, and health (ES&H) and emergency management programs at the National Nuclear Security Administration (NNSA) Nevada Test Site (NTS) in September and October 2002. The inspection was performed as a joint effort by the OA Office of Environment, Safety and Health Evaluations and the Office of Emergency Management Oversight. This volume discusses the results of the review of the NTS emergency management program. The results of the review of the NTS ES&H programs are discussed in Volume I of this report, and the combined results are discussed in a summary report.

NTS is located approximately 65 miles north of Las Vegas, Nevada, and encompasses approximately 1,375 square miles. The site is located in a high desert basin and is surrounded by wildlife ranges and the Nellis Air Force Base military gunnery range. Nuclear weapons tests were conducted at NTS from 1951 until the 1992 nuclear weapons testing moratorium.

The current mission of NTS includes supporting the NNSA stockpile stewardship program, which encompasses performing subcritical experiments in support of nuclear weapons stockpile verification efforts and maintaining NTS facilities and infrastructure. NTS also performs activities in the areas of environmental management (e.g., decontamination and decommissioning, waste management, and environmental technology development); national security response (e.g., emergency response to weapons of mass destruction); and defense and civil technologies (e.g., conventional explosives testing, characterization of hazardous material spills, and emergency response training). NTS activities involve significant quantities of hazardous materials in various forms, including radiological materials, explosive materials, and chemicals.

The NNSA Office of the Deputy Administrator for Defense Programs is the cognizant secretarial office for NTS. As such, it has overall Headquarters line management responsibility for programmatic direction, funding of activities, ES&H, and emergency management at the site. The U.S. Department of Energy (DOE) Headquarters Office of Environmental Management is responsible for directing and funding certain activities at NTS (including certain waste management activities). At the site level, the NNSA Nevada Operations Office (NV) has line management responsibility for NTS emergency management.

NTS is operated by Bechtel Nevada (BN), under contract to NNSA. NNSA national laboratories, including Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL), perform experiments at NTS and are responsible for operations of the U1a Facility and the Device Assembly Facility (DAF), which are used to support nuclear weapons stockpile stewardship. Throughout the evaluation of the emergency management program, OA reviewed the role of NNSA organizations in providing direction to contractors and conducting line management oversight of

contractor activities. OA is placing more emphasis on the review of contractor self-assessments and NNSA line management oversight in ensuring effective emergency management programs. In reviewing NNSA line management oversight, OA focused on the effectiveness of NNSA and NV in managing NTS contractors, including such management functions as setting expectations, providing implementation guidance, allocating resources, monitoring and assessing contractor performance, and monitoring/evaluating contractor self-assessments. Similarly, OA focuses on the effectiveness of the contractor self-assessment programs. DOE orders require contractors to establish self-assessment programs that review all aspects of the emergency management program.

The purpose of the emergency management portion of this inspection was to assess the effectiveness of selected aspects of emergency management program management as implemented at NTS under the direction of NV. In addition to NV's emergency management oversight and operational awareness activities, OA evaluated selected institutional-level emergency management program elements, such as plans and procedures; training, drills, and exercises; emergency public information; and self-assessment programs, the majority of which are managed and administered by the BN Operations Center organization. Furthermore, the OA team examined implementation of requirements at selected NTS organizations and facilities, specifically the U1a Facility, the DAF, and the Hazardous Material Spill Center. Facility-level reviews included an evaluation of hazards surveys and hazards assessments. As part of the overall program evaluation, the inspection team also conducted tabletop performance tests with a sample of the site's key decision-makers to evaluate their ability to employ available tools and skills developed in training to respond to postulated emergency conditions.

As discussed throughout this report, the emergency management program at NTS is generally well defined, emergency responders are trained and capable of handling potential emergency events, and NV and BN feedback and improvement programs are working effectively to self-identify and correct program and performance weaknesses. The current program effectiveness is attributed largely to the strong leadership and active involvement of the NV Manager, and the expertise and persistence of the NV emergency management operations team (EMOT) in monitoring and overseeing this program. However, the effectiveness of program implementation at the facility level varies and is not consistent among or within the contractor and national laboratory organizations at NTS. Serious weaknesses were identified in the area of hazards surveys and hazards assessments. The identification and analysis of hazards in these fundamental documents has not been established and maintained to provide an accurate technical basis for the other elements of the NTS emergency response program. NV has documented and BN understands the current program deficiencies, and in most cases they have established plans to address them.

Section 2 of this volume provides an overall discussion of the results of the review of the NTS emergency management program, including positive aspects and weaknesses. Section 3 provides OA's conclusions regarding the overall effectiveness of the NV, BN, LANL, and LLNL implementation of the NTS emergency management program. Section 4 presents the ratings assigned during this review. Appendix A provides supplemental information, including team composition. Appendix B identifies specific findings that require corrective action and follow-up. Appendices C through F detail the results of the reviews of individual emergency management program elements.

2.0 RESULTS

Many aspects of the NTS emergency management program are effectively implemented, including the training, drill, and exercise program, emergency public information program, and the BN self-assessment and NV oversight programs. Program requirements are well defined, and the basic infrastructure of plans, procedures, and response tools is in place to support emergency decision-making.

2.1 Positive Program Attributes

Through the strong leadership, direction, and active involvement of the NV Manager, the NV EMOT has implemented a comprehensive and extremely effective program for monitoring and overseeing the BN emergency management program. The NV oversight program that is being implemented by the EMOT includes a well-documented and comprehensive assessment and corrective action management process, a formal and detailed task plan documenting BN emergency management program deliverables, and financial performance incentives. All of these components have been used effectively to drive needed improvements and to set appropriate priorities and expectations for upgrading the BN program. For example, during fiscal year 2002, EMOT has used these program elements to direct much-needed improvements in BN hazards assessments, and the NV Manager has withheld fees from the contractor for failing to satisfy NV's hazards assessment performance expectations. Senior NV managers, most notably the Operations Office Manager, are actively involved in the NTS emergency management and response programs, and provide strong leadership to the EMOT in implementing their vigorous and effective oversight program.

NV and BN have established comprehensive training and qualification programs that effectively prepare emergency responders to perform their assigned response duties. Both organizations have developed position-specific qualification programs for each emergency response organization (ERO) member. The qualification programs and supporting training materials are well structured and routinely updated, and the training status of each ERO member is meticulously tracked. These qualification programs are supplemented by an aggressive drill and exercise program that has been highly effective in self-identifying performance weaknesses and facilitating continuous program improvement.

The performance of emergency responders at all levels of the NV and BN EROs exhibited many significant positive attributes, as demonstrated during tabletop performance tests. All of the responders clearly understood their assigned roles, responsibilities, and authorities; they demonstrated effective command and control of the postulated emergencies; and in most cases they took prompt and effective actions to protect site workers from the potential health and safety impacts of postulated hazardous material emergencies. Most responders adhered to proper emergency response protocols, and almost all of the responders made effective use of decision-making aids and checklists to ensure that their response duties were fully and correctly performed.

2.2 Program Weaknesses and Items Requiring Attention

Although the programmatic framework for NTS emergency management has been defined and established, some of the most fundamental elements of the program have not been adequately developed, implemented, and maintained to ensure that responders have the necessary tools and information to respond appropriately to an event, commensurate with the hazards.

BN and LLNL have not been completing required hazards surveys and/or hazards assessments in accordance with DOE and NV Order requirements before initiating facility operations, or when there are significant changes in facility operations or hazardous material inventories. Neither of the

BN hazards assessments reviewed by the evaluation team complied with the long-standing requirements of DOE Order 151.1A, *Comprehensive Emergency Management System,* or, more importantly, is adequate to support effective response to mitigate the potential consequences of an accidental hazardous material release. Significant weaknesses in these emergency management hazards assessments (EMHAs) have lingered despite clear and detailed feedback from NV. LLNL has not completed hazards surveys for the majority of NTS facilities under their cognizance to determine whether a facility or operation requires an EMHA, based on the hazards present.

The requirements and expectations for the BN consequence assessment teams (CATs) in the emergency management center (EMC) and emergency operations center (EOC) have not been adequately defined and documented to assist the CATs in fulfilling their assigned duties. A wide variety of consequence assessment deficiencies were observed during tabletop performance tests. Both CATs were unable to provide accurate and timely consequence assessment information to their respective EMC or EOC for at least one of the two scenarios presented to them. Weaknesses included failure to recognize that plume projections were not consistent with the prevailing winds, difficulties in operating the computer-based dispersion models, and using incorrect protective action criteria values when generating dispersion plots. Further, NV and BN implementing procedures do not clearly identify how the EOC CAT is expected to perform its role of validating plume projections generated by the EMC CAT.

The BN emergency plan and implementing procedures do not reflect current emergency response practices. Numerous BN emergency response implementing procedures have not been reviewed, updated, and maintained current, as required by DOE Order 151.1A. Many such procedures have not been updated in over two years, even though significant changes affecting those procedures and the BN response system have been implemented during that time. In addition, BN has not established a formal document control system to ensure that program and procedure changes are communicated effectively to facility owners, and that response aids and guidance are updated in a timely manner to reflect changes that can affect emergency management decision-making.

3.0 CONCLUSIONS

NV has clearly set forth the requirements and expectations for the NTS emergency management program through NV Order 151.1, *Comprehensive Emergency Management System*, and an NV consolidated emergency management plan (CEMP). The requirements therein apply to all contractors, national laboratories, and other Federal agencies and users of the NTS. The NV Manager is actively involved in the NTS emergency management program and has provided strong and emphatic leadership in ensuring that all NTS entities are fully prepared to respond to an emergency not only at NTS but also nationwide, through the deployment of NNSA assets and expertise. The NV Manager also has devoted significant resources to developing an emergency management operations team that is now comprised of a team leader with strong technical and managerial skills, and a highly competent and dedicated staff, supplemented by additional expertise where necessary, who work continuously to ensure that the manager's expectations are implemented effectively across NTS.

The NTS emergency preparedness and response elements common to all parties at the site, which are managed and implemented by BN, have clearly improved since the independent oversight evaluations that were conducted in 1998 and 1999. NV and BN have established an adequate programmatic framework that is supported by well-trained and practiced emergency responders. In the past year, NV and BN have devoted significant resources to training and conducting drills and exercises for the primary decision-makers in their respective EROs. Training and qualification programs are comprehensive, well documented, and maintained up to date. Further, NTS responders have participated in an aggressive schedule of drills and exercises that have been effective in self-identifying performance weaknesses. The effectiveness of the training, drills, and exercises was clearly reflected in the generally good performance of the emergency responders who were tested during the OA tabletop exercises conducted during this inspection. All of the responders clearly understood their roles, responsibilities, and authorities, and demonstrated excellent command and control at their respective response venues; further, most responders demonstrated the appropriate decision-making skills and set appropriate priorities for protecting workers and the public in the event of a hazardous material emergency at NTS. To support these response activities and guide their decision-making, both NV and BN have established a set of implementing procedures and other response aids, such as responder checklists and packets of pertinent response information. Responders used these tools effectively to facilitate their decision-making and to prioritize response actions.

However, some of the NV procedures are no longer consistent with the recently issued CEMP, and there are some ambiguities in assigned decision-making authorities. Many of the BN procedures are outdated and do not reflect actual response practices. For both NV and BN, formal control of procedures and response aids is not sufficient to ensure that all responders have the most current information available to support their decision-making. In addition, critical, fundamental decision-making elements, such as emergency action levels (EALs), do not have a consistent format and have not been assembled into a format that facilitates prompt decision-making.

The most significant weakness in the NTS-wide emergency management program is that the EMHAs, which form the foundation upon which all other emergency management elements are based, have not been established and maintained in accordance with DOE Order 151.1A. LLNL has not completed hazards surveys for most of the facilities they operate at the NTS and, thus, has not performed a hazards screening to determine whether an EMHA is required. Both BN hazards assessments that were reviewed during this inspection exhibited major weaknesses and did not comply with DOE Order 151.1A. As a result, EALs and predetermined protective actions have not been established for some known hazards that could clearly impact not only site workers but also personnel on adjacent land. In other cases, information about the type and magnitude of the hazards at some facilities might not be readily available

to emergency responders because neither a hazards survey nor hazard screening has been performed. However, NV managers and staff have demonstrated a strong and unwavering commitment to correct these problems. For example, they have denied contractor incentive fees on three occasions this fiscal year because inadequate EMHAs were submitted.

Despite these weaknesses, the remote location of most of the higher hazard facilities and the good anticipatory decision-making skills that were demonstrated during performance testing provide reasonable assurance that workers and the public will be adequately protected in the event of an accidental hazardous material release at NTS. More importantly, the leadership, active involvement, and personal attention devoted to emergency management at NTS by the NV Manager guarantees that any remaining weaknesses will be addressed to the satisfaction of NV. The NV EMOT has identified and documented most weaknesses identified in this report, is ensuring that effective corrective actions are implemented, and has set appropriate priorities for upgrading the BN emergency management program. The efforts of both NV and BN demonstrate a positive trend in identifying and addressing the challenges of implementing a comprehensive and integrated emergency management program on a vast, multi-tenant, multi-user NNSA site. While the BN Operations Center organization is working to address the weaknesses identified by NV and their own self-assessments, the organization's resources are continually being diverted to address unanticipated, time-urgent assignments. If this trend continues, senior BN management intervention may be necessary to ensure that appropriate emergency management program priorities have been established, commensurate with hazards, risks, and available resources. Nevertheless, BN understands the current program deficiencies and, in most cases, has established formal plans and schedules to address them.

4.0 RATINGS

This inspection focused on eight key emergency management program elements. The individual element ratings reflect the status of the respective NV, BN, LANL, and LLNL emergency management program elements at NTS at the time of this inspection. The rating assigned below to the contractor assessments and issues management sub-element of readiness assurance is specific to those assessment and corrective action mechanisms applied to the emergency management area.

The ratings for the individual program elements evaluated during this inspection are:

Emergency Planning

Hazards Surveys and Hazards Assessments.....SIGNIFICANT WEAKNESS
Program Plans and Procedures.....NEEDS IMPROVEMENT

Emergency Preparedness

Training, Drills, and Exercises.....EFFECTIVE PERFORMANCE
Emergency Public Information.....EFFECTIVE PERFORMANCE

Emergency Response

Emergency Response Decision-Making .....EFFECTIVE PERFORMANCE
Consequence Assessment.....NEEDS IMPROVEMENT

Readiness Assurance

NV Assessments and Performance Monitoring .....EFFECTIVE PERFORMANCE
Contractor Assessments and Issues Management .....EFFECTIVE PERFORMANCE

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APPENDIX A

Supplemental Information

A.1 Dates of Review

Scoping Visit	July 16-18, 2002
Onsite Inspection Visit	September 9-19, 2002
Report Validation and Closeout	October 1-3, 2002

A.2 Review Team Composition

A.2.1 Management

Glenn S. Podonsky, Director, Office of Independent Oversight and Performance Assurance
Michael A. Kilpatrick, Deputy Director, Office of Independent Oversight and Performance Assurance
Charles B. Lewis, Director, Office of Emergency Management Oversight
Patricia Worthington, Director, Office of Environment, Safety and Health Evaluations

A.2.2 Quality Review Board

Michael A. Kilpatrick
Robert M. Nelson
Patricia Worthington
Dean C. Hickman

A.2.3 Review Team

Charles Lewis, Director, Office of Emergency Management Oversight (Team Leader)

Kathy McCarty, Emergency Management Topic Lead
J.R. Dillenback
Michael Lloyd
Jim O'Brien
Jeff Robertson
Tom Rogers

A.2.4 Administrative Support

Tom Davis
Mary Anne Sirk
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APPENDIX B

Site-Specific Findings

Table B-1. Site-Specific Findings Requiring Corrective Action Plans

FINDING STATEMENTS	REFER TO PAGES:
1. Bechtel Nevada (BN) has not developed and maintained emergency management hazards assessments (EMHAs) in accordance with DOE Order 151.1A and NV Order 151.1, and emergency action levels (EALs) and predetermined protective actions have not been established for many potential accidents that could result in a classifiable emergency at the Nevada Test Site (NTS).	14-15
2. Lawrence Livermore National Laboratory has not maintained the Device Assembly Facility EMHA and has not prepared, completed, and/or maintained emergency management hazards surveys to determine whether any other facilities or operations under their cognizance that use or store hazardous materials at the NTS require quantitative analysis, as required by DOE Order 151.1A and NV Order 151.1.	16
3. BN's emergency plan and implementing procedures have not been maintained up to date, as required by DOE Order 151.1A, and do not accurately reflect current BN emergency response practices.	17
4. BN and Nevada Operations Office have not established a set of EALs that support timely emergency event classification or a process for prompt emergency event classification and notification when both the emergency management center (EMC) and emergency operations center (EOC) are operational, as required by DOE Order 151.1A.	18
5. The BN consequence assessment teams in the EMC and EOC did not demonstrate the ability to provide accurate and timely assessments of emergency event consequences, as required by DOE Order 151.1A.	33-34

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APPENDIX C

Emergency Planning

C.1 INTRODUCTION

Emergency planning consists of identifying hazards, threats, and hazard mitigation mechanisms; developing and preparing emergency plans and procedures; and identifying personnel and resources needed to assure an effective emergency response. Key elements of emergency planning include developing hazards surveys and hazards assessments to identify and assess the impact of site- and facility-specific hazards and threats, and to establish an emergency planning zone (EPZ). Based upon the results of these assessments, U. S. Department of Energy (DOE) sites and facilities must establish an emergency management program that is commensurate with the identified hazards. The emergency management plan defines and conveys the management philosophy, organizational structure, administrative controls, decision-making authorities, and resources that are necessary to maintain the site's comprehensive emergency management program. Specific implementing procedures that conform to the plan are then developed and provide the necessary detail, including decision-making thresholds, for effectively executing the response to an emergency, regardless of its magnitude.

This evaluation included a review of the development and maintenance process for Nevada Test Site (NTS) emergency management hazards surveys (EMHSs) and emergency management hazards assessments (EMHAs), a detailed evaluation of EMHAs for selected facilities and transportation of hazardous material, and a review of the NTS emergency plan and implementing procedures, with a focus on response organization, event classification, and protective action guidance.

C.2 STATUS AND RESULTS

C.2.1 Hazards Surveys and Hazards Assessments

Nevada Operations Office (NV) Order 151.1, *Comprehensive Emergency Management System*, and the Consolidated Emergency Management Plan (CEMP) developed and issued by NV define the emergency planning, preparedness, and response requirements for all NTS contactors and facility users. Both documents require NTS tenants to comply with the requirements of DOE Order 151.1A, *Comprehensive Emergency Management System*, in the preparation of EMHSs and EMHAs. The CEMP further requires that EMHSs and EMHAs conform to the hazards survey and assessment development methodology described in Volume II of the DOE Emergency Management Guide (DOE Guide 151.1-1). EMHSs and EMHAs at NTS are developed at the facility level and were observed to vary significantly, not only in format and content but also in the degree of rigor applied to identifying and analyzing hazards.

At the time of this inspection, there were no additional NTS procedures governing the development and maintenance of site or facility EMHSs and EMHAs to ensure that the requirements are completed satisfactorily and consistently for all NTS facility owners and/or users. Bechtel Nevada (BN) has recently written a draft procedure for developing EMHAs that includes guidance and a template for preparing a stand-alone EMHS. The current BN draft procedure provides a good process for EMHS/EMHA development. However, it includes at least one major deficiency—it does not require an analysis of hazardous material release consequences at 30 meters (or at the facility or exclusion zone boundary) to determine whether the applicable protective action criteria (PAC) have been exceeded at that distance, thereby requiring declaration of an Alert-level emergency. The analysis for emergencies at the Alert level is especially important at NTS because the primary at-risk population for most potential NTS incidents

would be local. Further, this procedure and template, when completed, would not apply to non-BN facilities and activities.

NV recently established three working groups that include members from all of the main tenants/users of the NTS (i.e., NV, BN, Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), Wackenhut Services, Inc., Sandia National Laboratories, and the Defense Threat Reduction Agency). The working groups were established to provide a forum wherein NTS emergency management planning is improved by discussing and addressing common sitewide issues, and by developing uniform methods for implementing emergency management program elements, based on input from all affected parties. One of these working groups, the Emergency Response Working Group, has been chartered to develop templates to support consistent preparation of EMHSs, EMHAs, and emergency action levels (EALs), which is a positive step in establishing consistent NTS program documents. Two members of this group have developed draft templates, but at the time of this evaluation the working group had not yet met to discuss these templates.

None of the facilities visited by the OA team had a stand-alone hazards survey document covering one or more facilities. For lower hazard facilities (i.e., facilities not requiring an EMHA), the EMHS requirements are generally met by information contained in facility emergency response plans. As described further in Appendix F, BN has performed approximately 200 facility-level assessments to assist facility owners in developing facility-specific emergency response information. The sample of facilities that OA visited indicated that this emergency response information is readily available for use in an emergency, and facility owners were knowledgeable of the information. For facilities for which EMHAs have been developed, the EMHS information generally has been incorporated into the EMHA.

The OA inspection team specifically reviewed the EMHAs for the U1a Facility, operated by LANL; the Device Assembly Facility (DAF); operated by LLNL; and the Hazardous Material Spill Center (HSC); operated by BN; and they also reviewed the current draft version of the onsite transportation EMHA (revision 3, dated August 2002). The draft transportation EMHA and the HSC EMHA contain major technical weaknesses; the DAF EMHA has not been updated since 1998; and the U1a Facility EMHA generally is satisfactory, with only a few minor weaknesses noted. As discussed later in this section, NV has recognized and documented the significant weaknesses in the EMHAs and is working vigorously to ensure that the EMHAs are upgraded to meet DOE and NV Order requirements and expectations. One weakness noted in all of the EMHAs reviewed is insufficient evidence to ascertain how the identified hazards were screened to determine whether further quantitative assessment was required. For example:

- Although emergency management technical experts and facility personnel apparently were involved in the U1a Facility EMHS development, there is only anecdotal evidence of how the hazard screening was originally performed.

- In the current draft transportation EMHA, it remains unclear how the screening and characterization processes for the onsite transportation of hazardous materials were conducted.

- As identified by NV, the bounding information on the types and quantities of hazardous materials likely to be present in the DAF is not provided in the EMHA.

Portions of the CEMP are ambiguous and make it difficult to interpret whether hazardous materials should be screened for further analysis. The CEMP states "Facilities which do not use chemicals or radiological materials above thresholds values, but which have significant operational hazards, may also be required to conduct an EMHA at the discretion of NNSA/NV." This has been interpreted by at least one facility manager to mean that only hazardous materials that exceed the DOE-mandated screening

thresholds require an EMHA. However, this does not meet the intent of the DOE order, which is to ensure that quantities of materials below those thresholds that have the potential to generate a classifiable emergency are quantitatively analyzed. This is also the expectation of NV, as identified in the risk management criteria of the Real Estate/Operations Permit process. In addition to requiring the NV Emergency Management Operations Team (EMOT) to review any project that includes hazardous materials above the mandated screening thresholds, the criteria also require EMOT to review any proposed work that could result in a classifiable event, as defined in DOE Order 151.1A. It is not clear, however, how the EMOT can exercise this discretion, since at the present time, Real Estate/Operations Permit forms are very rarely submitted by the cognizant project managers to EMOT for review. The recently revised manual governing this process should help to rectify this condition.

Examples of other significant weaknesses identified in the EMHAs include:

- The HSC and draft transportation EMHAs are not based on conservative quantities of material at risk (e.g., maximum allowable quantities or inventories on hand), but on impacts associated with damage to a single container of material.

- The DAF EMHA does not evaluate an appropriate spectrum of potential initiating events, including fires, natural phenomena, and malevolent acts.

- The DAF EMHA does not address the toxicity of high explosives present in the facility.

- The draft transportation EMHA does not adequately address malevolent acts as potential event initiators or adequately analyze the transportation of explosives that could cause collateral damage to other facilities where hazardous materials are used or stored.

- The HSC EMHA inappropriately considers Nellis Air Force Base as DOE/NNSA-controlled property, and potential Alert-level emergencies have not been properly analyzed.

- As identified by NV, the HSC EMHA inappropriately screens out radioactive materials and high explosives from further analysis without a sufficient technical basis; uses outdated PACs; does not establish EALs for chemical events identified as exceeding PAC levels beyond the facility boundary; is not based on conservative meteorological conditions; and does not address the potential impacts on event classification levels since the facility boundary distance was reduced.

Finding #1: BN has not developed and maintained EMHAs in accordance with DOE Order 151.1A and NV Order 151.1, and EALs and predetermined protective actions have not been established for many potential accidents that could result in a classifiable emergency at the NTS.

In order to ensure that technically accurate and defensible EMHAs are established for BN facilities, NV established fee-based performance incentives for fiscal year (FY) 2002 for five EMHA submittals. EMOT conducted a formal assessment of each EMHA submitted. Based on the results of these assessments, NV has withheld fees for three of the five incentives, and one EMHA has yet to be submitted for review. In addition, for findings identified in the assessment reports, NV requires BN to develop and submit a corrective action plan. NV determined that the corrective action plans submitted by BN for the HSC and transportation EMHAs are unacceptable.

Given the incomplete information provided in tables 4.1, 4.2, and 4.3 of the NV emergency readiness assurance plan for fiscal years 2002 through 2006 (dated November 2001), the OA team inquired about

the status of EMHAs for facilities other than the U1a Facility and DAF that are operated by the national laboratories. For example, table 4.2 of the emergency readiness assurance plan indicates that NV believes an EMHA might be required for the Big Explosives Experimental Facility and the Nevada Energetic Materials Operations Facility that are operated by LLNL. Although NV has no substantive evidence on which to base its assumptions, LLNL has not yet submitted information to NV that would contradict these assumptions. Furthermore, a June 2002 self-assessment identified that none of the LLNL-operated facilities at the NTS have a current "approved" hazards survey, and LLNL has not yet developed a corrective action plan to address this and other significant weaknesses identified in the assessment report. Since LLNL attributes these weaknesses, in part, to a lack of resources, the LLNL Nuclear Test Operations organization has requested an additional full-time employee to address these program weaknesses.

Finding #2: LLNL has not maintained the DAF EMHA and has not prepared, completed, and/or maintained EMHSs to determine whether any other facilities or operations under their cognizance that use or store hazardous materials at the NTS require quantitative analysis, as required by DOE Order 151.1A and NV Order 151.1.

The NTS EPZ is identified in the CEMP, and is reviewed and approved by NV through the CEMP review and approval process. BN is the assigned lead organization for developing the site EPZ and has developed it in accordance with DOE expectations by integrating the NTS facility EPZs. Nevertheless, the basis for the site EPZ is not yet technically defensible for existing site conditions due to the status of the facility EMHAs. The EPZ weaknesses are well understood by NV and they plan to address these issues through the Emergency Response Working Group.

In summary, senior NV managers have applied significant pressure and the EMOT has appropriately devoted much of its attention to ensuring that BN EMHAs are upgraded to meet the requirements of DOE Order 151.1A. While BN is working to improve their EMHAs, current versions of the EMHAs reviewed by the inspection team still do not meet DOE and NV Order requirements. LLNL has not performed required hazards surveys or screened hazardous materials to determine whether an LLNL facility or operation at the NTS warrants an EMHA.

C.2.2 Program Plans and Procedures

The CEMP clearly specifies that individual contractors and users of NTS facilities are responsible for implementing the provisions of the plan and developing facility-level emergency management programs that are consistent with the requirements of the plan. The CEMP was recently revised to provide significantly more detail on expectations for contractor- and user-developed emergency plans and procedures because of concerns that tenant- and facility-specific programs were not adequately meeting NV's expectations. NV Order 151.1 and the CEMP provide a good foundation for the NTS emergency management program.

In addition to setting expectations for and overseeing the contractors' emergency management programs, NV plays a very active role in responding to operational emergencies (beyond oversight of the contractor's response). NV has established a set of procedures and other response aids to support actions in the emergency operations center (EOC) located in the NV support facility in Las Vegas. In general, the procedures and response aids provide good information to guide emergency response and, in particular, the position-specific checklists are very useful. However, the EOC procedures have some weaknesses. For example, although the CEMP has a lot of detailed information on event classification and protective action decision-making, this information has not been translated into EOC response documents. Also, DOE Order 151.1A requires state and county officials to be notified of an Alert or Site Area Emergency

within 15 minutes of event classification, but the CEMP allows 30 minutes for these notifications. In addition, the CEMP and EOC staffing procedures contain a number of inconsistencies related to roles and responsibilities. For example, the security director is authorized to classify events in accordance with the EOC activation procedure, but not in accordance with the CEMP. In addition, some inconsistencies were identified in the emergency manager's and deputy emergency manager's responsibilities for event classification and protective actions. Finally, concerns were identified with document control. A formal document control process in not in place for the CEMP, EOC procedures, or response aids. One particular problem identified is that the position-specific response binders in the EOC, which contain EALs extracted from EMHAs, did not include the same set of EALs as other response binders (e.g., those at the BN emergency management center (EMC) and in the incident command vehicle). This could cause confusion and delays in making accurate decisions during an emergency.

As the management and operating contractor, BN has responsibility for sitewide response to emergencies at the NTS, including fire and rescue, hazardous material incident command, and EMC operations. BN has established an emergency plan to guide the development, implementation, and maintenance of its emergency management program and a set of procedures supporting sitewide emergency response actions. The set of emergency response procedures generally provides good instructions supporting the response to a variety of emergencies that may occur at the NTS. The BN procedures that specifically address hazardous material response and incident command are particularly effective response tools. In addition, the BN fire department has taken the initiative to enhance their response procedures by developing a set of situation-specific operating instructions (currently in draft form) and has plans to develop an easy to use pocket-sized response tool based on these instructions.

On the other hand, the inspection team identified a number of weaknesses in BN's sitewide emergency plan and implementing procedures. Specifically, the emergency plan is inconsistent with the CEMP in a number of areas and lacks some important elements, such as a description of the procedure development and maintenance process, identification of specific responsibilities for emergency planning and response, and a clear description of the chain of command in the event of an emergency. In addition, numerous BN response procedures no longer reflect actual response practice. For example, many such procedures have not been revised for over two years even though some significant changes have occurred in response practices during that time. The most significant concern with the outdated procedures is that the responsibilities of the newly added BN Duty Manager position, which plays a critical role in event notification, are not specified in any BN procedure. Other processes not addressed by BN procedures are the interfaces between the EMC and EOC consequence assessment teams, the new automated telephone system for notifying site personnel of emergencies (i.e., the GeoNotify system), and the current form used by BN to perform emergency event notifications (a BN form that is inconsistent with the NV-developed form). Most of these weaknesses have been identified by BN, and they have initiated a significant effort to revise the documents. However, the document revision process is onerous and has caused significant delays in issuing revised procedures.

Finding #3: BN's emergency plan and implementing procedures have not been maintained up to date, as required by DOE Order 151.1A, and do not accurately reflect current BN emergency response practices.

Two additional significant concerns were identified in BN response procedures. First, BN's emergency classification procedure and process do not facilitate prompt and accurate event classification. Specifically, the procedure does not include EALs to support classification or refer to a controlled response aid containing a set of EALs. Instead, the procedure directs responders to use information contained in facility-specific hazards assessments. Similar to NV, BN has established a set of response binders that include EALs to support classification by the incident commander in the field and the crisis

manager in the EMC. However, the binders are not formally controlled, and the EALs are not in a consistent, user-friendly format to support prompt and accurate classification by the incident commander or crisis manager. In addition, some of the EALs contain errors, such as an HSC EAL that identifies an event as an Alert when the EMHA analysis indicates that the event warrants a Site Area Emergency classification level. During one of the OA-administered tabletop performance tests, this error caused confusion and delays in classification. Further, BN and NV have established a process that requires discussion and EOC concurrence on event classification decisions made by the EMC, which can also cause unnecessary delays in classifying events when both the EOC and EMC are operational. The other significant concern is that the current process for completing and transmitting emergency notification forms when the EMC and EOC are operational is unnecessarily complicated. The BN duty manager, who is remotely located from the EMC and the EOC, initially fills out the form. The form is then sent by facsimile to the EMC for review, who in turn faxes the form to the EOC, where the information is transferred to a new form and approved by the NV emergency manager. Upon approval, it is then provided to the EOC watch officer for transmittal. During the tabletop performance tests, these processes resulted in unnecessary delays in event classification and notification.

Finding #4: BN and NV have not established a set of EALs that support timely emergency event classification or a process for prompt emergency event classification and notification when both the EMC and the EOC are operational, as required by DOE Order 151.1A.

All facility owners at the NTS have the responsibility for developing facility-specific emergency plans. A sample of facility-specific plans and procedures was evaluated for the U1a Facility, the DAF, and the HSC. In general, these facility-specific plans and procedures adequately support emergency response at the facilities and include instructions for evacuation, assembly, and event notification. BN also took the initiative to develop a company directive and template to support uniform facility response plan development. In addition, in FY 2001 BN did a walkdown of a large number of BN facility emergency plans with facility owners to ensure that the plans and procedures conformed to BN expectations. Other good practices include the checklist contained in the HSC procedure to support the local emergency director's response actions, and U1a Facility and DAF emergency plan implementing procedures for event classification, which include EALs in a more user-friendly format than that provided in their EMHAs. In addition, the U1a Facility classification procedure includes immediate protective actions with each EAL to facilitate prompt protective action decision-making.

Some concerns were identified with the facility emergency response procedures. For example, none of the plans reviewed identify the BN Duty Manager's GeoNotify system as a method for notifying facility personnel of an emergency. In addition, the HSC facility plan does not include guidance for categorizing events that do not require further classification. Immediate protective actions for events classified as an Alert or a Site Area Emergency are the same for the U1a Facility (both are conservative), but do not match protective actions recommended in the EMHA. Finally, maps in emergency plans are missing details, such as a geographic scale that would be useful during an emergency.

NV has developed an order and emergency plan that provide a good framework for the NTS emergency management program. In addition, NV and BN have established a set of response procedures and aids that support many of the sitewide response actions. BN, LLNL, and LANL have established plans and procedures that support facility-level response actions. However, a number of weaknesses that may adversely affect emergency response were identified, primarily in the BN sitewide response plans and procedures. Specifically, numerous BN procedures do not reflect current response practices, and the event classification and notification procedures and processes do not support prompt classification and notification of emergencies.

C.3 CONCLUSIONS

NV has established and promulgated appropriate programmatic emergency planning requirements applicable to all NTS contractors, tenants, and facility users. In addition, NV and BN have developed a good sitewide infrastructure in terms of procedures and response tools for responding to an emergency. However, this infrastructure is not supported by a comprehensive and accurate technical basis that provides assurance that current, essential, and required hazard information is readily available to responders and decision-makers. Furthermore, many response plans and procedures contain inconsistencies among them, and the current emergency classification and notification processes do not ensure that these response activities will be performed without unnecessary delays. The high degree of management attention currently directed toward the fundamental emergency planning elements must be sustained to ensure that this technical basis is fully developed and that supporting procedures are revised, controlled, and maintained to reflect current emergency response practices.

C.4 RATINGS

A rating of SIGNIFICANT WEAKNESS is assigned to the area of emergency management hazards surveys and hazards assessments.

A rating of NEEDS IMPROVEMENT is assigned to the area of program plans and procedures.

C.5 OPPORTUNITIES FOR IMPROVEMENT

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management, and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Nevada Operations Office

1. **Establish NTS-wide expectations for consistency in EMHS and EMHA documents.** Specific actions to consider include:

   - Provide an outline and description of the acceptable format and content of EMHS and EMHA documents, tailored, as necessary, to the specific needs of NTS and its tenants.

   - Establish criteria that trigger the initiation, review, or revision of an EMHS or EMHA document by NTS tenants.

   - Establish criteria for determining whether an EMHA is required for facilities that do not use chemicals or radiological materials above regulatory threshold values, but have significant operational hazards that could potentially result in a classifiable event.

   - Identify mechanisms to ensure that NV project managers are cognizant of changes to the Real Estate/Operations Permit manual relating to emergency management and are held accountable for implementing emergency planning and preparedness requirements

   - Periodically verify that LLNL and LANL hazards surveys (and those for other NTS tenants) have been developed and are being maintained in accordance with NV requirements.

- Enlist the assistance of the home laboratory and the appropriate line management chain to ensure that LLNL and LANL meet NV's expectations for EMHSs, EMHAs, and input to the NV emergency readiness assurance plan.

- Review and revise the CEMP as necessary to ensure that all expectations and requirements pertaining to EMHS and EMHA development are captured in a single section of the plan.

2. **Develop a document control process for emergency management documents.** Specific elements that should be included in the process are:

   - A list of controlled procedures and response aids that includes the position-specific checklists used by EOC personnel

   - Instructions for revising procedures, including the review and approval process, and requirements for identifying/summarizing changes

   - Instructions on the process for distributing procedures, including instructions for completing training requirements before implementing procedure changes.

3. **Revise the CEMP and EOC response procedures to remove conflicting statements on roles and responsibilities**. Examples of conflicting statements that should be addressed include:

   - The EOC staffing and EOC activation procedures do not identify event classification as a duty of the EOC emergency manager (contrary to the CEMP).

   - The EOC activation procedure specifies a limitation on the deputy emergency manager's authority for classifying events that is not specified in the CEMP or other response procedures.

   - The EOC activation procedure states that the security director can classify events, whereas the CEMP does not identify this authority.

4. **Enhance EOC emergency response procedures.** Specific actions to consider include:

   - Develop EOC procedures that address event classification and protective action identification and implementation. These procedures could utilize much of the information provided in the CEMP, and should provide specific instructions for EOC personnel who are responsible for these actions.

   - Revise the EOC notification and reporting procedure to provide additional detail on the process utilized by the EOC watch officer to make the notifications. The procedure should include details on the primary and secondary means for performing notifications that are contained in the CEMP.

5. **Clarify NV's role in event classification**.

   - Consider revising the classification process to place classification responsibility solely on the EMC crisis manager when both the EMC and EOC are activated (i.e., remove the requirement for NV concurrence on event classification). This is particularly important when an event is degrading and prompt event classification facilitates protective action formulation and activation of additional response resources.

Bechtel Nevada

1. **Clarify the criteria for analyzing hazards in site procedures and guidance.** Specific actions to consider include:

   - Establish a requirement to analyze for potential Alert-level emergencies, in accordance with DOE Order 151.1A.

   - Establish PAC for the toxic effects of chemical explosives.

   - Implement a mechanism in the NTS HAZTRAK system that triggers notification of the cognizant line managers and BN Operations Center personnel if hazardous materials are received above an NV-defined threshold.

   - Identify and implement mechanisms to hold project managers accountable for implementing emergency planning and preparedness requirements.

2. **Enhance the draft EMHA for onsite transportation**. Specific actions to consider include:

   - Write a separate EMHS document that establishes a detailed basis for identifying and screening hazardous materials that need to be analyzed in the EMHA.

   - Incorporate the best available information, as appropriate, from the hazards analysis section of the draft "Onsite Transportation Safety Document" into the EMHA.

   - Conduct an analysis of onsite explosive events in the EMHA.

3. **Enhance the BN sitewide response procedure document control and revision process.** Specific actions to consider include:

   - Develop a procedure revision process that allows BN procedures to be kept current with response practices. For example, use temporary change notices until complete procedure revisions can be issued.

   - Establish a list of formally controlled response documents and instructions for the distribution and maintenance of controlled copies.

   - Develop a process for communicating sitewide response plan and procedure changes to facility owners to help facilitate maintaining facility procedures current with sitewide response practices.

4. **Enhance BN sitewide response procedures for event classification and protective action determination.** Specific actions to consider include:

   - Revise the event classification procedure to include EALs or to reference a formally controlled response aid.

   - Include pre-determined protective actions with each EAL.

5. **Enhance the HSC emergency plan.** Specific actions to consider include:

   - Add new maps that specifically identify normally occupied locations and include consistent geographic scales.

   - Specify the immediate protective actions appropriate for each EAL (or at least for each classification level).

   - Provide instructions for performing notifications specific to HSC events, instead of referring to the sitewide BN notification procedure.

   - Provide a list of personal protective equipment that is to be maintained available to support response actions.

Bechtel Nevada, LLNL, LANL

1. **Develop a document that formally defines the contractor-specific and laboratory-specific processes for developing hazards surveys and hazards assessments**. Base the document on CEMP requirements.

LANL

1. **Enhance the U1a Facility emergency response plans and procedures.** Specific actions to consider include:

   - Review the immediate protective actions associated with EALs for the U1a Facility to ensure that they are appropriate.

   - Develop a checklist to help the local emergency directors (LEDs) implement and prioritize response actions.

LLNL

1. **Enhance the DAF emergency plan and procedures.** Specific actions to consider include:

   - Identify pre-determined protective actions for each EAL.

   - Develop a checklist to help LEDs implement and prioritize response actions. Although the notification checklist contained in the DAF procedure provides some guidance, the procedure could be improved by the addition of a checklist that provides step-by-step instructions for the LED.

APPENDIX D

Emergency Preparedness

D.1 INTRODUCTION

A coordinated program of training, drills, and exercises is necessary to ensure that emergency response personnel and organizations can effectively respond to emergencies impacting the site or facilities. For a training program to be effective, it must include initial training to develop individual and team skills, and periodic training to keep the emergency response organization (ERO) proficient while keeping pace with changes to plans, procedures, and facility equipment. To be effective improvement tools, exercises using realistic, simulated emergency events and conditions should be used to validate all elements of an emergency management program and to provide ERO members an opportunity to practice their skills. An effective emergency public information program provides the public and the media with accurate and timely information during an emergency event. In part, this is based on having in place a long-term program to educate the public and the media about actions that may be required during an emergency response.

The Office of Independent Oversight and Performance Assurance (OA) team evaluated the training, drill, and exercise program used to support the Nevada Test Site (NTS) EROs at both the sitewide and facility levels. This included a review of training and drill plans, teaching materials, and training records for Nevada Operations Office (NV), Bechtel Nevada (BN), Lawrence Livermore National Laboratory, and Los Alamos National Laboratory emergency responders. Records and processes associated with the NV and BN emergency management exercise program were also evaluated. Finally, the team evaluated the emergency public information plan and procedures for responding to an emergency at the site.

D.2 STATUS AND RESULTS

D.2.1 Training, Drills, and Exercises

The training, drill, and exercise program for NTS emergency responders is a composite of many separate elements, including various departments within BN, such as the fire department, NV, the national laboratories, and Wackenhut Services, Inc. The NV consolidated emergency plan (CEMP) sets goals and objectives for the training, drill, and exercise program and delineates the program implementation responsibilities of each cognizant facility owner. BN and other contractor and tenant organizations responsible for individual NTS facilities are required to provide initial training and periodic drills to all workers who may be required to take emergency protective actions. The NV emergency management operations team (EMOT) leads the NV emergency response staff assigned to the NV emergency operations center (EOC) and oversees the site ERO training, drill, and exercise program. Over the last year, BN and NV have dedicated substantial time and effort to revamping and formalizing their respective training programs. Because of the new CEMP and its significantly increased requirements, NV and BN are working toward a more performance-oriented training program.

NV and BN have established rigorous training programs that effectively prepare their respective ERO personnel for their assigned response duties, including initial qualification and annual refresher training. The core of the training programs is position-specific qualification curricula developed for each ERO member. NV and BN have developed and employ formal, comprehensive qualification packages to implement the CEMP training requirements, including position-specific job task analyses, requirements and prerequisites, and qualification plans consisting of required courses, readings, and activities.

The BN training and qualification program has numerous positive attributes. For example, the qualification program for BN emergency management center (EMC) staff was originally developed using job task analyses and has been continually improved by incorporating lessons learned. BN effectively uses the OnTrack for Training system and another spreadsheet application to track the training and qualification status of individuals. Lesson plans are detailed and receive a thorough review annually by subject matter experts and training managers. Additionally, BN offers emergency-related information and training on site-specific conditions and hazards to offsite personnel who may be required to respond to an emergency at NTS. Another positive initiative is the assignment of BN emergency management personnel from the Operations Center organization to support the emergency response programs at facilities run by other organizations, such as the national laboratories. These individuals maintain the associated qualification programs, develop drill packages, and coordinate facility-level exercises with the BN emergency management staff.

The level of training accomplished by the BN fire and rescue organization is extensive. The fire department's training cadre includes a state-certified fire and emergency services Master Instructor, three state-certified Fire Service Instructors, and three state-certified Paramedic Instructors who collectively provide all necessary fire and rescue training, including hazardous material technician courses and incident commander field training. Firefighters and paramedics are all certified at the hazardous material technician level, and the fire department Chief, Deputy Chiefs, and Assistant Chiefs are currently fully qualified as incident commanders. The fire department also provides training to offsite response organizations.

The defined NV training and qualification program is outstanding and should serve as a model for the rest of the National Nuclear Security Administration (NNSA)/U. S. Department of Energy (DOE) complex. NV developed an EOC staffing procedure as the basis for their qualification program and effectively uses this procedure to select candidates for assignment to the EOC. Appropriate hands-on EOC training is provided for NV emergency response staff through small-group EOC operations walkthroughs. Senior NV managers routinely actively participate in the NV training, drill, and exercise program and continually emphasize the importance of emergency preparedness. In addition to all of the position-specific training requirements, the program requires responders to observe field response activities in other venues, such as at the incident command post, tactical operations center, and EMC, and other response activities, such as a no-notice activation drill. This is intended to provide the EOC responders with a sense and understanding of the issues, actions, information flow, and response time requirements of other components of the NTS response system. The comprehensive nature of the program, however, makes it difficult for responders to achieve and maintain "fully qualified" status. Only a few of the individuals filling the ten core EOC positions and only 25 percent of the entire EOC staff have fulfilled all of the requirements for full qualification status. As a result, NV has also defined an "interim qualification" status that establishes the minimum training requirements for serving on the NV ERO. These minimum requirements are sufficient to fully prepare the EOC members to capably fulfill their ERO responsibilities, as was demonstrated by their performance during the EOC performance tests administered by OA during this inspection. The EMOT has recently recognized that completion of all of the requirements to achieve fully qualified status is difficult due to a number of contributing factors, and is currently evaluating alternatives for ensuring that NV ERO members can meet EMOT expectations for training. NV has also been proactive in improving the integration of the BN and NV training activities and providing line management oversight of the BN training program.

The focus of another NV emergency management working group—the Emergency Operations Working Group—is discussion, consensus, and solutions to training, drill, and exercise issues. In November 2001, BN developed a comprehensive drill and exercise manual that provides an effective and detailed tool to maintain proficiency, but the manual is still in draft form. NV is currently revising the draft manual, and

the revision will serve as the official NV exercise manual. Nevertheless, the drill and exercise packages reviewed during this inspection were developed in accordance with the draft manual. The draft manual provides the format for all drill and exercise packages, including the standardization and coordination of emergency response activities, and provides detailed and comprehensive guidelines and requirements for administering tabletop performance tests, drills, and exercises. The guidelines effectively address such key topics as controller and evaluator roles, safety and security plans, and developing scenarios, objectives, and after-action reports. Exercise packages reviewed by the inspection team were sufficiently detailed to provide the participants, controllers, and evaluators with the necessary information regarding the exercise and results, including the evaluation methodology, event description, critique information, and overall conclusions.

The overall training, drill, and exercise program effectively prepares NV and BN ERO staff for their assigned duties. However, the OA inspection team noted a few weaknesses in this area. Most importantly, neither NV nor BN has documented their respective training programs or requirements in an emergency plan or procedure. As previously mentioned, the responsibility for training, drills, and exercises throughout NTS is distributed among various organizations associated with NTS operations. Given the complexity of the site and the disparate organizational responsibilities, a formally documented, comprehensive training plan or matrix that identifies topical areas of training would more effectively ensure that training programs are consistent, integrated, and coordinated in support of the overall emergency management program goals. This was recently self-identified in a BN assessment that recommended a stand-alone comprehensive training program plan. Other weaknesses in the training area include the lack of an approved qualification program for the BN Deputy Crisis Manager position that was recently added to the EMC ERO, and inconsistent use by NV of training course titles within various NV training documents. In the latter case, this has created confusion regarding the identity of required training courses.

The OA inspection team noted two concerns in the area of emergency preparedness exercises—the lack of fully developed exercise objectives and criteria, and the lack of uniform, sitewide requirements and expectations for drill programs. NV has adopted the emergency management exercise critical response performance metrics that were transmitted in a draft memorandum from the DOE Headquarters Office of Emergency Operations. The Headquarters draft memorandum states that although site/facility annual exercises should focus on these critical response performance criteria, it is expected that other objectives would also be demonstrated and evaluated during the exercises. NV has supplemented the original six Headquarters metrics with two additional metrics—termination and recovery, and the conduct of exercises. These eight metrics and their underlying evaluation criteria now serve as the only exercise objectives for NTS. While this has significantly streamlined NV's and BN's approach to exercises, it also has the potential to cause confusion regarding specific response objectives and criteria. For example, there is no performance metric focused on emergency medical support, and during a recent NTS exercise, the medical response performance was covered under the very broad performance goal and evaluation criteria in the "emergency response organization" category. In addition, "offsite response interfaces" may not be adequately defined and addressed by the existing objectives and criteria. For example, the notifications and communications evaluation criteria may not be sufficient to set expectations for performance when responders from offsite come to NTS to assist in response efforts. Thus, strict use of these predefined objectives and criteria may not provide sufficient specificity to identify the actions being evaluated and the expected actions of responders.

In addition to concerns with existing exercise objectives and criteria, the drill and exercise manual that is undergoing revision incorporates changes that might limit NV's ability to ensure a uniform, sitewide drill and exercise program. It incorporates recent changes to the CEMP, transfers all responsibility for drill development and execution to the facility owners, and excludes all references and guidance regarding tabletop performance tests and drill preparation and performance. Although the responsibilities for drill

programs may be more appropriately assigned to BN and the laboratories, if NV does not establish overall requirements and expectations, the current effectiveness of the drill programs might diminish.

To summarize, despite the challenges of integrating numerous training elements, NV and BN have developed strong training, drill, and exercise programs. Qualification programs and their supporting training materials are well structured, routinely updated, and tracked. The drill and exercise manual is an effective tool to measure and maintain emergency response capabilities. Finally, the high degree of NV engagement in the program provides assurance that training, drill, and exercise program goals will be attained. While there is no coordinated description of overall training goals and objectives or sitewide interaction of these programs, efforts are underway to develop a comprehensive training document and to coordinate training approaches to ensure resolution of training element concerns. The overall strong performance observed during the performance tests conducted by OA during this inspection demonstrates that the training, drill, and exercise program has effectively prepared the ERO to respond to an incident at NTS.

D.2.2 Emergency Public Information

The NV Office of Public Affairs (OPA) is responsible for emergency information dissemination to the public, the media, and other stakeholders during an emergency. This function is conducted in accordance with the OPA ERO procedures document. This document serves as a combined emergency public information plan and procedure that describes policy elements and provides supporting desk instructions for activating and managing a joint information center (JIC). During an emergency, all NTS contractors and facility owners are responsible for providing OPA personnel with the information necessary to accomplish the emergency public information function. If an event occurs at NTS, the affected facility and the BN Office of Strategic Communications provide a technical advisor and a senior spokesperson, respectively, to the JIC.

The OA inspection team noted several strengths in the NTS emergency public information program. The OPA ERO procedures document is a comprehensive source of direction to emergency public information staff and provides coordination details regarding personnel, resources, and facilities. The desk instructions provide a clear methodology for informing the public of NNSA emergency plans and protective actions before and during emergencies. The instructions include specific provisions for: activating the JIC at the Site Area and General Emergency classification levels and for partial activation for other emergencies; coordinating emergency public information efforts with Federal, state, local, and tribal organizations; and developing and approving news releases. Furthermore, OPA has adopted a firm policy, outlined in the OPA ERO procedures document, to communicate information about their emergency activities to the public in a prompt and accurate manner. The news release process clearly identifies the individual authorized to release information to the public (i.e., the OPA Director or designee), and includes provisions for a security classification review of all information prior to release.

While the emergency public information processes are well conceived and, in most cases, appropriately documented, there are a few programmatic weaknesses. The most important of these is that NV has not established a formal training program to support the emergency public information element. This is common at many DOE and NNSA sites because public affairs is routinely overlooked as an integral component of the emergency planning and response program, and it is not recognized that the public affairs officer's duties during an emergency differ significantly from the officer's day-to-day responsibilities because of the time-urgent nature of providing emergency public information. OPA staff assigned to the EOC receive general emergency responder training covering the concept of emergency operations, but have not received any position-specific training courses applicable to activating and operating the JIC. The only training received has been in concert with their participation in drills or tabletop tests, but these activities have not provided OPA staff an opportunity to review and thoroughly

understand their checklists or to appreciate the relationship of their individual roles to the effective functioning of the overall emergency public information element.

A few weaknesses in the OPA ERO procedures document were also identified. The OPA ERO checklist does not provide adequate guidance to ensure that news releases are appropriately coordinated with the NV emergency manager, as was demonstrated during the OA tabletop performance tests. In addition, the plan calls for the initial release of information within 30 minutes to one hour of arriving at the EOC. This is not consistent with DOE expectations that an initial news release be released within approximately one hour of the event. There is also no formally defined process for notifying Headquarters of news releases. Finally, the OPA procedures document has not been updated since 1999. However, this issue was self-identified, and several plan/procedure updates are currently in draft form.

In conclusion, NV has developed a comprehensive emergency public information program that is commensurate with site hazards. The program is implemented through an integrated set of implementing procedures that, in most cases, is adequate to ensure that NTS stakeholders will promptly receive accurate information in the event of an emergency. However, the emergency public information function is not adequately supported by position-specific training, and the OPA plan/procedures document is outdated. Although these weaknesses are mitigated by the experience and skill of the OPA staff, their resolution, particularly with regard to program documentation, will help ensure the long-term effectiveness of the emergency public information program.

D.3 CONCLUSIONS

BN and NV have developed strong training, drill, and exercise programs, and training materials are well structured, routinely updated, and tracked. The overall strong performance observed during the tabletop tests demonstrates that the training, drill, and exercise program has effectively prepared the ERO to respond to an incident at NTS. The NV emergency public information program is comprehensive, and is supported by an integrated set of implementing procedures that, in most cases, adequately ensures stakeholders will promptly receive accurate information.

D.4 RATINGS

A rating of EFFECTIVE PERFORMANCE is assigned to the area of NV and BN training, drills, and exercises.

A rating of EFFECTIVE PERFORMANCE is assigned to the area of emergency public information.

D.5 OPPORTUNITIES FOR IMPROVEMENT

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management, and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Nevada Operations Office and Bechtel Nevada

1. **Develop a comprehensive training plan.** Specific items that should be addressed in the plan include:

    - Develop a list of all responsible site organizations that provide emergency management-related training and training program reviews, including the Human Resources and Operations Center organizations, Health Physics Department, and fire department.

    - Develop ERO training requirements for all positions in and levels of the ERO, including incident commanders, local emergency directors (LEDs), the EMC, the EOC, consequence assessment teams, and public affairs personnel.

    - Develop an accurate list of course titles and training requirements matrices.

Nevada Operations Office

1. **Enhance existing training documents**. Specific actions to consider include:

    - Review the EOC staffing procedure, EOC cadre training requirements, lesson plans, and Web postings to ensure consistent course titles.

    - Add guidance on the purpose, scope, and criteria for developing and conducting effective tabletop tests and drills for the NV ERO.

    - Develop a mechanism to periodically verify that LEDs for laboratory-operated facilities have maintained their qualification and training requirements.

2. **Review the draft exercise manual and the critical response performance metrics to ensure that each exercise is evaluated based on position-specific objectives that are commensurate with the scope of individual and organizational response duties.**

    - Consider adding procedure references to exercise performance goals and criteria to tie performance weaknesses to specific program expectations.

3. **Enhance emergency public information plans and procedures.** Specific actions that should be considered include:

    - Revise the current plan and procedures to ensure that emergency public information can be initially released within approximately one hour of an event.

    - Update, coordinate, and finalize the Emergency Public Information Program procedure, OPA plan and desk instructions, and the ERO OPA Director checklist.

4. **Develop a training program for OPA staff that addresses position-specific functions within the EOC and JIC. Base the lesson plans on approved, final procedures.**

APPENDIX E

Emergency Response

E.1 INTRODUCTION

The ultimate objective of emergency planning and preparedness is to ensure that emergency responders can apply their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public in the event of an emergency. Critical elements of initial response include categorizing and classifying the emergency, formulating protective actions, and notifying onsite personnel and offsite authorities. Concurrent response actions include re-entry and rescue, provision of medical care, and ongoing assessment of event consequences using additional data and/or field monitoring results.

The majority of the information provided in this section is the result of tabletop performance tests that were conducted by the Office of Independent Oversight and Performance Assurance (OA) with two local emergency directors (LEDs) from the Hazardous Material Spill Center (HSC), two LEDs from the U1a Facility, three fire and rescue incident commanders (ICs), and two emergency management center (EMC)/emergency operations center (EOC) teams. Consequence assessment support personnel also participated in the EMC/EOC tabletop tests. A total of three operational emergency scenarios were utilized for the performance tests. One scenario involved a fuel truck accident that causes a diesel fuel fire and an ammonia leak from material postulated to be stored at HSC. Another scenario postulated a rapidly spreading fire in the vicinity of a special nuclear material assembly underground at the U1a Facility. The third scenario involved a malevolent act with hostages taken that progresses into a radiological material release when several drums of waste are punctured at the transuranic waste storage pad. The scenarios were developed by OA in conjunction with Nevada Operations Office (NV) and Bechtel Nevada (BN) trusted agents. The trusted agents presented the scenario information to the performance test participants to ensure scenario validity and delivery of accurate event cues.

E.2 STATUS AND RESULTS

E.2.1 Emergency Response Decision-Making

In the event of an emergency at an NTS facility, the facility LED provides initial direction and control of the event and serves as the on-scene IC until relieved by a security or senior fire and rescue officer who has arrived on scene. The senior fire and rescue officer also serves as the initial IC for non-facility-specific events, such as transportation accidents. After the onsite EMC in Mercury, Nevada, becomes operational, the BN crisis manager assumes responsibility for protective action decision-making for site personnel, overall command and control authority, and notification responsibilities. When the NV EOC in Las Vegas becomes operational, the NV emergency manager assumes the responsibility for offsite notifications and protective action recommendations and concurs on all categorization and classification decisions.

Local Emergency Directors

All of the HSC and U1a Facility LEDs who were evaluated during the tabletop exercises understand their roles and responsibilities for directing the initial emergency response actions at their respective facilities and, in general, effectively utilized their facility response procedures to protect personnel, classify events, and notify appropriate organizations. Specifically, the LEDs promptly initiated actions to assemble and

account for facility personnel; correctly classified the postulated events; and, in general, effectively utilized protective action information contained in their procedures to formulate protective actions for nearby facilities. The HSC LEDs made effective use of available equipment and resources, such as high-resolution cameras, radios with a frequency dedicated to HSC workers, material safety data sheets, and pre-run plume plots of hazardous chemical releases to support response activities. The U1a Facility LEDs also demonstrated some noteworthy actions, especially those related to directing underground response actions for temporary refuge and extrication of personnel. In addition, they demonstrated a very good understanding of underground emergency equipment and response protocols.

Although all LEDs were proficient in most response duties, some weaknesses were identified during the tabletop performance tests. For example, neither of the LEDs at the U1a Facility considered actions to minimize the potential radiation exposure to essential personnel in the area, even though their procedures provided instructions to do so. Furthermore, one of the LEDs lacked a clear understanding of the potential impact area that an Alert classification denoted. One of the HSC LEDs also exhibited some performance weaknesses. For example, the LED relied on the workers to choose the correct evacuation route (an alternate route to the primary route that was impacted by the plume) rather than specifically identifying the correct route. Furthermore, the LED was not able to find some important information in the emergency plan (i.e., a response checklist and evacuation map) and chemical hazard information in the HSC hazards assessment.

Fire Department Incident Commanders

All of the fire and rescue ICs who were evaluated demonstrated good command and control and effectively utilized support resources to protect workers and to classify the three events that were presented to them. The ICs quickly set up the IC staff positions of operations, communications, and safety; communicated well with response personnel (including good use of "repeat backs"); promptly directed security officers to isolate the event scene and account for personnel; and evaluated and implemented protective actions for co-located facilities. The ICs demonstrated their knowledge and effective use of the 2000 Emergency Response Guidebook to determine the isolation zone for the postulated ammonia cylinder leak, including considering how a fire impacting the cylinder might change the isolation zone. Furthermore, the ICs interacted well with the LEDs (played by trusted agents) and employed the set of emergency action levels (EALs) contained in the IC response binder to correctly classify all of the postulated events. Finally, the ICs demonstrated a good understanding of their responsibilities as support personnel during a security event.

Although the ICs were proficient in most response duties, weaknesses were identified during the tabletop performance tests. For example, as with the LEDs, the ICs did not take effective action to minimize exposure of emergency workers in the vicinity of the potential radioactive release at the U1a Facility. Furthermore, as with one of the U1a Facility LEDs, the ICs did not have a good understanding of the potential impact area that an Alert classification denoted. One IC thought an Alert at the U1a Facility meant that the impact was limited to the underground. Another IC thought that an Alert meant that the impact did not exceed 30 meters. Additional weaknesses were identified during the security scenario. Specifically, the ICs did not take proactive action to evaluate whether the location of the incident command post and security personnel was acceptable after the postulated release of radioactive material; did not take action to control the spread of contamination; and did not establish provisions for decontaminating personnel. Finally, a concern regarding the rigor of the turnover of responsibilities between the LEDs and ICs during an event was identified. Neither the LEDs nor the ICs demonstrated a clear transfer of command and control or the effective division of responsibilities for emergency response in a unified command structure. Some of these weaknesses may be attributable, in part, to the inherent artificialities of performance testing. However, the observed performance does indicate areas where response performance was not completely effective.

EMC/EOC Teams

All of the BN crisis managers and NV emergency managers who were evaluated demonstrated very good command and control, and appropriately focused on protective actions for emergency responders and workers who were potentially impacted by the postulated events. Some noteworthy actions included:

- Excellent use of support personnel, including the deputy crisis manager, safety advisor, EMC coordinator, and EMC communicator in the EMC; and the deputy emergency manager, security director, and safety advisor in the EOC

- Effective control over all response activities, including timely staff briefings; effective use of the "meet-me line"; and clear setting of priorities

- Good use of procedures, checklists, and tools, including the WebEOC system

- Appropriate decisions on protective actions and, in most cases, event classification.

Furthermore, the crisis managers and emergency managers had a very good understanding of the roles and responsibilities of personnel in the EMC, EOC, and in the field (i.e., the LED and the IC). In particular, the crisis managers and emergency managers demonstrated a clear understanding of their respective roles in supporting the tactical operations center during the security event, and both the EMC and EOC made appropriate preparations to support response in case the security event resulted in a release of hazardous material. Additionally, during all of the event scenarios, the EOC cadre was cognizant of their oversight role and did not try to direct response actions.

In addition to the good performance by the crisis managers, the EMC support staff members were all very knowledgeable of their emergency response duties and performed very well. In particular, the safety, health physics, and environmental waste management advisors were proactive and demonstrated very good actions to provide protection for site workers, the public, and emergency responders. For example, they recommended appropriate treatment of both of the contaminated and injured persons during the postulated security event, including prioritizing life safety over decontaminating the severely injured person; they considered recommending the use of chelation therapy to minimize radiation dose to the injured persons; and they made provisions for sending a radiation control technician to the hospital where the severely injured person was to be treated. In addition, one of the EMC teams was very proactive in preparing to send personal protective equipment to the event scene for the security guards and deploying field monitoring teams. Finally, in most cases, the safety advisors, with the support of the EMC staff, used maps effectively to continuously evaluate the location of the incident command post and workers in the field, and the potential for them to be impacted by the event.

The NV emergency managers, deputy emergency managers, and EOC support staff were also knowledgeable of their response roles and performed very well. The deputy emergency managers were particularly effective in dealing with specific actions, such as a review of EALs for event classification, thereby allowing the emergency manager to focus on the broader response effort. One EOC security director was extremely effective in formulating rules of engagement, presenting the rationale and regulatory basis to the emergency manager, and communicating with the tactical operations center during the security scenario. Additionally, protective actions were considered for site areas not immediately affected by the postulated release in case the wind shifted.

Although the EMC and EOC teams performed well overall, a few weaknesses were identified. For example, in a number of cases, the crisis manager did not provide a clear initial briefing, including

identifying the assigned responsibilities of the EMC responders, and response priorities were not clearly tracked on status boards. Although communications between the EMC and EOC were generally effective, the telephone "meet-me line" had a high ambient noise level that made it difficult to hear communications, and there was no clear indication of when a particular party was on the line (waiting for other parties to join in). In addition, one of the EOC teams did not promptly develop explicit rules of engagement; they delayed providing such rules to the tactical operations center while awaiting approval from the NV Manager, who was not a member of the EOC response team. A significant weakness was identified during one event scenario when poor communications between the EMC consequence assessment team (CAT) and EMC staff, and the lack of a careful EAL review by the crisis manager and his deputy resulted in an improper event classification (Alert versus Site Area Emergency). Finally, as discussed in Appendix C of this report, inappropriate delays occurred in event classification and notification because of the complex processes that have been established for performing these operations when both the EMC and EOC are operational. Although the emergency classifications were delayed only a couple of minutes, and notifications were delayed only about ten minutes because of these processes, these delays are unwarranted and could be more significant when additional organizations/individuals are actually involved in the response (e.g., LEDs and ICs who did not participate in the EMC/EOC tests).

During the tabletop performance tests, NTS emergency responders serving in key positions demonstrated very good knowledge of their roles and responsibilities and, in most cases, took prompt and effective actions to protect site workers, emergency responders, and the public. Areas of effective performance included command and control by ICs, crisis managers, and emergency managers, and use of available tools by all response personnel to mitigate the impact of the postulated accident scenarios. However, some weaknesses were identified. Most significantly, the LEDs and ICs did not act promptly to minimize the impact of a potential radiological release on emergency workers, and they did not understand the consequences of an Alert level emergency. In addition, there was an improper, non-conservative classification during one scenario. Although these weaknesses indicate areas for improvement, these were generally isolated performance weaknesses among the 15 classification opportunities provided to emergency decision-makers during the tabletop tests.

E.2.2 Consequence Assessment

The responsibilities of the EMC and EOC CATs have not been sufficiently defined and coordinated to ensure that these teams can fulfill their respective roles in an emergency. The consolidated emergency management plan (CEMP) stipulates that during a hazardous materials operational emergency occurring during normal duty hours, two CATs will be activated; one in the EMC and one in the EOC. The EMC CAT is responsible for generating the primary dispersion model products to be used in formulating onsite protective actions and, until the EOC is activated, recommending offsite protective actions. The EOC CAT is responsible for validating the EMC dispersion model products that are generated. The BN EMC CAT procedure does not acknowledge the existence of an EOC CAT or identify any requirements for providing consequence assessment data to the EOC. The EMC CAT procedure indicates that HOTSPOT and ALOHA are the primary modeling tools of choice, which is inconsistent with the CEMP and the EOC CAT procedure that both require the use of NARAC as the primary modeling tool. The procedure also does not identify that the initial dispersion plot generated by the EMC CAT will use consequence assessment data derived from the emergency management hazards assessments (EMHAs) that has been pre-loaded into the computer to facilitate a rapid initial assessment that incorporates current wind conditions. Until very recently, this same data was not available on computers in the EOC. Overall, there is no procedural direction or guidance indicating whether the EOC CAT is expected to use the same dispersion model and/or same source term information to validate the consequence assessment data generated by the EMC, or whether it is expected to use a different model to perform its assigned role of validating the EMC dispersion information. During the tabletop performance tests, the EOC CATs attempted to verify the accuracy of the EMC dispersion data, but never ran the same dispersion code and

source term as the EMC CATs. Further, it is extremely difficult to adequately validate the data that is sent to them via facsimile because it is received in black and white. Thus, the dose or concentration contours that are delineated by different colors on the dispersion plots cannot be readily identified, and much of the text information is illegible.

Both the EMC and EOC CATs generally understood their roles and responsibilities and, in some instances, provided good support to EMC and EOC response activities. Both sets of EMC and EOC CATs were generally knowledgeable of and adept in using the consequence assessment models and response tools, including procedures, checklists, handbooks, EMHAs, and reference manuals. Additionally, the EMC CATs showed good judgment in applying pre-analyzed scenarios from the EMHAs to the postulated event conditions; they were proactive in analyzing additional potential threats; and they vigilantly monitored site weather conditions.

However, there were several performance weaknesses among the EMC and EOC CATs. One significant weakness was that neither EMC CAT recognized that their initial dispersion plots did not show the plume traveling in the same direction as the prevailing winds. In one case, the projected plume appeared to be traveling in the opposite direction of the known wind conditions. One EOC CAT immediately recognized the cause of the error as a malfunctioning meteorological tower. The other EOC CAT immediately recognized that the wind direction was incorrect when they received the first dispersion plot sent from the EMC. In the latter case, the EMC and EOC CATs were not able to determine the cause of the problem. Thus, the initial dispersion information presented to the EMC for the ammonia release was incorrect during both CAT performance tests.

Many additional concerns were identified in the CATs' performance:

- The EMC and EOC CATs generated incorrect consequence assessment results when the gram quantity of the source term was entered into the dispersion code in units of Curies, without applying the applicable conversion factor.

- One of the EMC CATs used the "immediately dangerous to life and health" value for ammonia as the protective action criterion (PAC) instead of the Emergency Response Planning Guideline (ERPG)-2 value.

- One of the EOC CATs used an outdated Temporary Emergency Exposure Limit (TEEL) value for the ammonia PAC rather than the more conservative and current ERPG-2 value. The EOC safety advisor informed the team of the appropriate PAC to apply, but the team continued to use the incorrect value throughout the exercise.

- One of the EOC CATs modeled a release occurring over four days, while almost all of the other dispersion plots generated in the EMC and EOC were appropriately based on a default one-hour release duration.

- One of the EOC CATs did not correctly log in to the computer server for the NARAC system and was therefore unable to obtain a NARAC plot during the exercise. The team was subsequently able to generate a plot using the ALOHA model.

- One of the EOC CATs was unable to overlay ALOHA dispersion plots onto a site map so that the potential geographical impact of the postulated release could be readily visible to the EOC staff, and the other EOC CAT modeled one of the postulated releases from the incorrect release point.

- One of the EMC/EOC CAT sets ran their dispersion models using the same source term information, but very different stability classes (stability class B versus F).

- According to the WebEOC, one of the EMC CATs generated consequence assessment data indicating that the PAC was exceeded at 0.6 miles and provided protective action information based on that data. When the dispersion code was immediately re-run using the same source term data, the results showed that the PAC was exceeded at 300 feet; however, no protective action information accompanied this WebEOC entry.

As a result of these problems, the CAT teams were unable to generate accurate consequence assessment information in a timely manner for EMC and EOC decision-makers to use. As noted in Appendix F of this report, NV has recognized these weaknesses and is planning to include consequence assessment as an element of the fiscal year 2003 fee-based performance incentives. Finally, the EOC CATs experienced some equipment problems, including difficulties with a facsimile machine that caused a delay in receiving data from the EMC, and a malfunction of the computer used in the EOC to generate dispersion plots that caused the modeler to resort to his own personal computer to perform his duties.

Finding #5: The BN CATs in the EMC and EOC did not demonstrate the ability to provide accurate and timely assessments of emergency event consequences, as required by DOE Order 151.1A.

E.3 CONCLUSIONS

The overall performance of the emergency response decision-makers demonstrated that they are adequately prepared to respond to emergency events at NTS. During the tabletop performance tests, NTS emergency responders serving in key positions demonstrated very good knowledge of their roles and responsibilities, demonstrated effective command and control, and in most cases took prompt and effective actions to protect site workers, emergency responders, and the public. The CATs also demonstrated good performance in some areas, such as in using hazardous material reference documents and in running the dispersion models to support the emergency response. However, several consequence assessment weaknesses were identified. The roles and responsibilities of the CATs have not been adequately defined, and many significant performance weaknesses associated with the input to and interpretation of the dispersion model results were observed. As a result, all of the CATs tested were generally unable to provide accurate and timely consequence assessment information to their respective EMC or EOC so that worker and public exposures to potential hazards could be readily assimilated by decision-makers.

E.4 RATINGS

A rating of EFFECTIVE PERFORMANCE is assigned to the area of emergency response decision-making.

A rating of NEEDS IMPROVEMENT is assigned to the area of consequence assessment.

E.5 OPPORTUNITIES FOR IMPROVEMENT

This Independent Oversight review identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and

evaluated by the responsible NNSA and contractor line management, and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Nevada Operations Office

1. **Provide emergency response personnel additional guidance and training on developing rules of engagement during a security event.** Specific actions to consider include:

   - Revise the EOC operations procedure and position checklists for the security director and emergency manager to address roles and responsibilities for determining and approving rules of engagement for security events.

   - Train EOC, tactical operations center, and security personnel on their responsibilities, and perform drills that test the capability of these organizations to coordinate with each other in formulating and approving rules of engagement.

Bechtel Nevada

1. **Improve the ability of on-scene decision-makers to effectively utilize protective action guidance**. Specific actions that should be considered include:

   - Provide training on using immediate protective action guidance contained in facility emergency plans and/or EMHAs. (As discussed in Appendix C, this information should be extracted from these documents and included in a controlled procedure or response aid to support these response actions).

   - Provide training to LEDs and ICs on the definitions of the different emergency classes and how this information can be utilized to assist in protective action decision-making.

   - Provide training to LEDs and ICs regarding protective action decision-making as it concerns emergency responders.

2. **Identify mechanisms to ensure effective turnover of command and control responsibilities.** Specific actions that should be considered include:

   - Consider developing a pre-formatted form that identifies the information topics that should be addressed when turning over incident command responsibilities (e.g., number of casualties, event categorization and classification level, accountability information, facility personnel who have or can provide event information, protective actions implemented or directed, etc.).

   - Perform drills that focus on turnover of command and control responsibilities between LEDs and ICs, and between security and fire/rescue responders.

3. **Clarify the roles, responsibilities, and procedure requirements for the EMC and EOC CATs.** Specific actions that should be considered include:

   - Establish a single procedure that governs the activities of both CAT teams to ensure that expectations among all team members are consistent. This procedure should be developed by BN and approved by the NV EMOT.

- Determine specifically how the EOC is expected to fulfill its function of "validating" EMC dispersion data, and determine which data is to be provided to the EOC for decision-making.

- Develop a form similar to that used by the EMC CAT (OP2120.018) to capture the specific input information that is used to generate a particular dispersion model run and the resultant recommendations.

- Provide the same pre-loaded scenarios in the EOC that are available in the EMC; provide training and establish expectations for their use in an emergency.

- Assign responsibilities to an NV and/or BN individual for maintaining the ERPG and TEEL values in the emergency response binders current.

- Ensure that the EMC and EOC CAT procedure(s) and checklists are consistent with the CEMP expectation that communications be maintained with the state EOC Bureau of Radiological Health dose assessment group.

4. **Improve the proficiency of CAT responders.** Specific actions that should be considered include:

   - Conduct routine drills of the EMC and EOC CATs both separately and simultaneously, and require them to self-assess their performance and identify corrective actions.

   - Require CAT members to periodically demonstrate their proficiency in their respective CAT assignments.

   - Verify that all CAT members can transfer plume projections onto appropriately scaled maps to readily indicate to decision-makers the site areas and facilities potentially impacted by a hazardous material release.

   - Ensure that potential differences in using differing dispersion models (e.g., HOTSPOT and ALOHA versus NARAC) are well understood by CAT plume modelers.

   - Establish response tools that summarize the parameters of the different scenarios available in HOTSPOT to aid in rapid interpretation of modeling results.

   - Require EMC and EOC CAT members to participate in drills in one another's assigned response venue.

5. **Enhance dispersion modeling capabilities and output products.** Specific actions to consider include:

   - Query NARAC as to the possibility of providing distance information in the table beside the plume plot for the resulting NARAC contours as opposed to the area impacted.

   - Implement a mechanism for electronically or otherwise transmitting plume projections between the EMC and EOC that allows for ready interpretation of the information received.

APPENDIX F

Readiness Assurance

F.1 INTRODUCTION

The readiness assurance program provides the Department-wide framework and multiyear planning mechanism for ensuring that program plans, procedures, and resources are adequate and sufficiently maintained to mount an effective response to an emergency. Readiness assurance activities include implementation of a coordinated schedule of program evaluations, appraisals, and assessments. Key elements of the readiness assurance program include the active involvement of National Nuclear Security Administration (NNSA) line organizations in monitoring program effectiveness, contractor self-assessment programs, and timely implementation of corrective actions for identified weaknesses. For exercise evaluations, readiness assurance includes assessment of the effectiveness of the exercise as a means of demonstrating and continuously improving a site's integrated response capability.

This Office of Independent Oversight and Performance Assurance (OA) inspection examined the processes by which the Nevada Operations Office (NV) provides guidance and direction to and maintains operational awareness of the Nevada Test Site (NTS) emergency management program. The inspection also included a review of Bechtel Nevada (BN) emergency management self-assessments and the status of actions taken to address identified program weaknesses.

F.2 STATUS AND RESULTS

F.2.1 NV Assessments and Performance Monitoring

The NV Manager has appropriately directed and applied significant resources toward improving the NTS emergency management program, and these efforts have proven invaluable in driving the actions necessary to establish and maintain the contractor and tenant emergency planning and response capabilities. The NV Emergency Management Operations Team (EMOT) is well staffed with highly competent individuals, including the recent addition of an individual to focus almost exclusively on the emergency management hazards assessment (EMHA) problems described in Appendix C of this report. The EMOT performance monitoring program is accomplished through a variety of activities, including a structured assessment program to evaluate the NTS emergency management program against U. S. Department of Energy (DOE) requirements; contract performance measures and deliverables; and routine meetings to discuss task plan milestones and program status.

The NV assessment processes and methodologies are clearly defined by the April 2002 NNSA/NV Emergency Management Functional Area Validation/Assessment Plan, which establishes responsibilities for all aspects of the program, down to assignments of individuals as managers for assessments of emergency management functional elements. This plan is effectively implemented, and NV performance monitoring includes many positive attributes, including:

- Scheduling and tracking of assessments, corrective action plans, and the status of findings
- Evaluating facility, organization, and site-level programs
- Using pre-established assessment criteria based on draft DOE Guide 151.1, Vol. VI, *Emergency Management Evaluations*
- Risk ranking evaluation findings

- Formalized reporting mechanisms that include appropriate levels of review, validation, and approval, based on the results of risk ranking
- Verifying and documenting the closure of findings.

The assessment program is designed to evaluate all elements of the emergency management program over a three-year period, at minimum. In fiscal year (FY) 2002, NV conducted, formally documented, and transmitted approximately 25 assessments to the applicable contractor/laboratory organization. Key elements that were evaluated by these assessments included EMHAs, the emergency response organization, and training, drills, and exercises. Assessment findings were assigned a risk ranking, and for those findings that exceeded the established risk threshold, corrective action plans were developed by the contractor and approved by NV. The documentation of assessments, corrective action plan reviews, and findings closure indicates an appropriate level of rigor and, overall, these assessments were comprehensive, value-added oversight activities performed by individuals knowledgeable of the subject area.

Detailed task plans that include specific contract deliverables and milestones provide for such major activities as sitewide exercises, program enhancements, and equipment upgrades, and are approved by NV and implemented by BN. The EMOT meets monthly with BN to discuss the task plans, contract deliverables, exercise planning and performance, and corrective action plans. Additionally, performance measures and related award fees are used to focus attention and improve BN performance for specific elements of the emergency management program. In FY 2002, award fees related to the development of EMHAs were withheld because the quality of the EMHAs submitted to NV for review, in accordance with established milestones, did not meet NV's expectations. This is noteworthy because it indicates the importance NV places on the quality of these documents, which serve as the foundation for all other elements of the hazardous materials emergency management program. Because assessments of consequence assessment capabilities and EMHAs indicate continued weaknesses, planned performance measures and related award fees for FY 2003 are expected to include both of these elements.

The NV emergency readiness assurance plan (ERAP) adequately documents the emergency planning and preparedness activities for NTS and provides the appropriate level of information and analysis necessary for it to be an effective tool for managers. However, the ERAP submitted for FY 2002 does not include complete data for facilities and organizations outside the control of BN, such as the Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), Defense Threat Reduction Agency (DTRA), and IT Corporation. For example, the hazards survey status table in the ERAP indicated "no data provided" for LANL, DTRA, and IT Corporation facilities. To address this issue, as well as others related to the consistency and quality of program documents, NV has established three emergency management working groups comprising representatives from NV, BN, LLNL, LANL, and DTRA. The working groups' initial priorities are the development of an exercise manual and the creation of standards for format and content of common documents, such as EMHAs, emergency management hazards surveys (EMHSs), emergency action levels, and the ERAP. Drafts of these standards documents are in various stages of development.

In conclusion, NV oversight of the emergency management program is comprehensive and well managed. Formal assessments and routine feedback mechanisms continue to drive programmatic improvements and enhanced performance. Assessments are comprehensive, value-added oversight activities performed by individuals knowledgeable of the subject area. Additionally, the EMOT has established effective programs and processes, such as task plans and contract performance measures, for defining expectations and requirements for the NTS emergency management program.

F.2.2 Contractor Assessments and Issues Management

The NTS consolidated emergency management plan (CEMP) requires contractors, laboratories, and other NTS users to conduct an annual internal assessment of all aspects of a facility's or site's emergency management program, and to establish and maintain a corrective action program that tracks open actions and verifies the correction of findings and application of lessons learned. As the prime performance-based management and operating contractor, BN is responsible for evaluating most programmatic elements of the NTS emergency management program, including training and staffing for emergency response organization positions. In addition to BN, other organizations, such as LLNL, LANL, and Wackenhut Services, Inc., are responsible for assessing facility- and organization-specific implementation of CEMP requirements, including the adequacy of EMHSs, EMHAs, emergency response procedures, and training for local emergency directors.

The BN Operations Center organization conducted a self-assessment of the emergency management program in April and May 2001 that would serve well as a model for other DOE/NNSA sites. In addition to being comprehensive and self-critical, all aspects of the assessment, including evaluation criteria, objective evidence, findings, and corrective actions, were thoroughly and clearly documented. Many of the weaknesses identified by the OA inspection team were also self-identified by BN.

Starting in 2001, BN has conducted approximately 200 facility-level assessments with facility owners. BN provides a self-assessment checklist, walks the facility owner through the assessment process, and helps the owner establish a binder of pertinent emergency management information for the facility. BN conducts similar annual assessments at their facilities at other sites (i.e., LLNL, LANL, Remote Sensing Laboratory - Andrews, Remote Sensing Laboratory - Nellis, and Special Technologies Laboratory). A sample of BN facilities verified that facility owners had their binders of emergency management information readily available, including EMHSs and facility emergency response procedures, and were knowledgeable of the contents of those binders. Based on this sample and discussions with facility owners, the BN facility-level self-assessments were determined to be very effective in raising facility owner awareness of facility-level emergency management program requirements.

Other significant assessment activities by BN include the BN draft Egg Point Wildland Fire Recovery Report, developed in response to the August 16-26, 2002, wildland fire at NTS. This report is noteworthy not only for the thoroughness and timeliness of the evaluation, but also for the valuable lessons learned and proposed corrective actions. BN also thoroughly evaluated the impact of the recent CEMP revision on their program by comparing CEMP requirements to BN implementing documents, and developed a corrective action plan identifying actions needed to fully comply with the CEMP. The BN emergency management exercise program was also the subject of a self-assessment in July 2002. Additionally, BN has been re-evaluating their concept of operations in the emergency management center based upon drills and exercises and has added some new positions in an effort to improve communications and emergency management center coordination.

BN has implemented effective processes to manage issues identified by assessments and exercises, including capturing corrective actions, assigning responsibilities for and tracking corrective actions, and routinely reporting on the status of findings. Many program improvements have been implemented in response to weaknesses identified by drills, exercises, and assessments. However, there are numerous corrective actions that have not been completed in a timely manner, and as a result, the benefits of having conducted very thorough self-assessments are limited. For example, 29 percent of the open corrective actions are overdue and another 15 percent are coming due at the end of September 2002. Greater than 80 percent of the corrective actions from the FY 2001 self-assessment are incomplete and overdue. Because it was recognized that little progress had been achieved in addressing findings from the previous self-assessment, the FY 2002 self-assessment was limited to identifying this as a weakness. The reason for

the backlog of corrective actions is attributed by BN to the drain on personnel resources that is being caused by the large number of planned and unplanned activities that have occurred in FY 2002, including four full-field exercises, one partial-scope exercise, numerous drills, and the assignment of BN Operations Center personnel to support LLNL emergency management activities. Additionally, some burdensome administrative processes have slowed the completion of corrective actions, such as procedure revisions. NV and BN are working together to identify ways to reduce the load on Operations Center resources, such as reducing the scope of exercises, so that the backlog of corrective actions can be reduced.

In conclusion, BN has identified improvement opportunities from a variety of activities, including exercises, drills, self-assessments, and the comprehensive evaluation of the response efforts for an actual event. The self-assessment conducted in FY 2001 and the report developed in response to the August 2002 wildland fire are particularly noteworthy. The processes used to assign, track, and report the status of corrective actions are also effective, and many corrective actions and improvements have been implemented. However, a significant backlog of overdue corrective actions exists. Both BN and NV recognize this issue, and plans to address it are being discussed.

F.3 CONCLUSIONS

The EMOT, with strong support from the NV Manager, the Assistant Manager for National Security, and its own team leader, has implemented an exemplary program for monitoring and improving all aspects of emergency management performance at the NTS. Expectations for contractor performance are clearly defined and enforced through a variety of methods. BN drill, exercise, and assessment programs provide valuable information on emergency management processes and performance. However, continued management attention by BN is warranted to ensure that priorities are clearly established consistent with site and facility hazards and the availability of BN personnel resources.

F.4 RATINGS

A rating of EFFECTIVE PERFORMANCE is assigned to the area of NV assessments and performance monitoring.

A rating of EFFECTIVE PERFORMANCE is assigned to the area of contractor assessments and issues management.

F.5 OPPORTUNITIES FOR IMPROVEMENT

This Independent Oversight review identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible NNSA and contractor line management, and prioritized and modified as appropriate, in accordance with site-specific programmatic emergency management objectives.

Nevada Operations Office

1. **Focus oversight on completion of corrective actions.** Specific actions that should be considered include:
   - Until the corrective action backlog is significantly reduced, consider focusing upcoming assessments on the completion and effectiveness of BN corrective actions.
   - Continue to work with BN to identify and, where possible, eliminate barriers to completing corrective actions.

Bechtel Nevada

1. **Prioritize programmatic improvements.** Specific actions that should be considered include:

   - The backlog of overdue corrective actions should be evaluated to identify those items that will adversely affect ongoing work or will require significant rework if they are not completed in the near term.

   - BN management should ensure that assigning unplanned work to the BN Operations Center is balanced against the overall priorities of the emergency management program.

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